BioZ® Cardio Profile

Service Manual

CE 0197

Bio Z® Cardio Profile Service Manual**, P15738-01**
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1 Use of the Manual

Before repairing the system, read completely and carefully the instructions provided in this manual. If you do not understand any instructions or need additional information, please contact SonoSite Technical Support.

The intended purpose of this manual is to help biomedical and/or clinical engineering personnel understand the functions of the system, to identify possible failures, and to guide in the repair.

Before starting an analysis with regards of potential hardware problems, it is important to make certain that the system has been applied and operated in accordance with the instructions outlined in the user's manual.

Because of the complexity of the system and the numerous interactions between hardware and software components, when encoutering issues, we recommend contacting our service department prior to troubleshooting.

We can assist to identify a possible failure and recommend the best and most efficient method to resolve the issue(s).

For the best possible support, we recommend a short description of the issue(s) observed and all possible data from the system. (See Chapter 4: "Indentification of System and Software Version").

These conventions are used in this service manual:

- A **WARNING** describes precautions necessary to prevent injury or loss of life.
- A **Caution** describes precautions necessary to protect the product.
- Numbered steps must be performed in a specific order.
- Bulleted lists present information in list format but do not imply a sequence.

1.1 Explanation of used symbols

	Associated instructions provide important information to prevent injury, loss of life, or product damage
	Do not dispose with residual waste
	Device type BF, Defibrillator-proofed
	Device type BF
	Insulation class I
	Equipotential connector
	Caution, electrostatic sensitive devices
	USB-Connector
	Device Powered On
	Stand-By
	Connector for external keyboard
	Network connector
	Connector for external VGA-monitor
IOIOI	Connector for serial interface

2 Contact Information

Questions and comments are encouraged. SonoSite is interested in your feedback regarding the service manual. If you encounter difficulty with the system, use the information in this manual to help correct the problem. If the problem is not covered here, contact SonoSite Technical Support as follows:

Technical Support (USA, Canada) 1-877-657-8118

Technical Support fax: 1-425-951-6700

Technical Support e-mail: service@sonosite.com

SonoSite website: **www.sonosite.com** (Select Support)

3 Warnings and Cautions

For maximum safety, observe the following warnings and cautions:

WARNING: The *Bio Z® Cardio Profile* is intended for use only within hospitals and other healthcare facilities (e.g. outpatient clinics, physician's office) that provide patient care.

WARNING: To avoid the risk of an electric shock, this device must be connected to supply mains with protective earth.

WARNING: Before opening the system, ensure that the system is switched "OFF" and the power cable is disconnected from the A.C. power mains.

WARNING: The *Bio Z® Cardio Profile* must be connected by a three-wire power cable to an electrical outlet that has been properly installed and grounded.

WARNING: The monitor is not protected against explosive substance. Do not use the *Bio Z® Cardio profile* in the presence of flammable anaesthetics or gases.

WARNING: Before replacing the external fuse on the unit, disconnect the unit from the main power supply by pulling the plug out of the wall socket.

WARNING: Before cleaning or disinfecting the measuring unit, disconnect the unit from the main power supply by pulling the plug out of the wall socket.

WARNING: Do not modify any SonoSite products. Any modifications to the device will void the warranty.

WARNING: Systems equipped with a battery must have the battery disconnected to avoid short circuit or contact with developed high voltage (up to 900V) which is present for the backlight inverter of the TFT display.

Caution: The system and/or software must be maintained, repaired, modified or altered only by persons authorized by medis/Sonosite or with prior approval by medis/SonoSite.

Caution: Never gas-sterilize the patient cables. They are covered with a PVC shroud that can react with the gas-sterilization procedure to form a highly toxic ethyl nitrite. Sterilization in an autoclave, with ultrasound or gamma rays is also not permitted.

Caution: Do not sterilize the *Bio Z® Cardio Profile* parts or accessories. Sterilizing the device or accessorries will void the warranty.

Caution: Use only cables or components recommended by SonoSite to connect to the inputs and outputs of the monitor.

Caution: Do not place the measuring unit on a surface which emits heat or expose it to direct sunlight. Do not cover the ventilation slits.

Caution: Do not operate in bathrooms or other areas where water damage is possible. The *Bio Z® Cardio Profile* is not protected against splashing water.

Caution: The *Bio Z® Cardio Profile* should be placed near the patient and fixed in such a way that the *Bio Z® Cardio Profile* cannot fall down if someone pulls on the cable.

Caution: The *Bio Z® Cardio Profile* is protected against accidental ingress of liquids. If liquids ingress into the case, disconnect the monitor from the wall outlet.

Caution: Do not expose the cables to mechanical or thermal impact. Avoid temperatures above 40 °C (100 °F).

4 Identification of System and Software Version

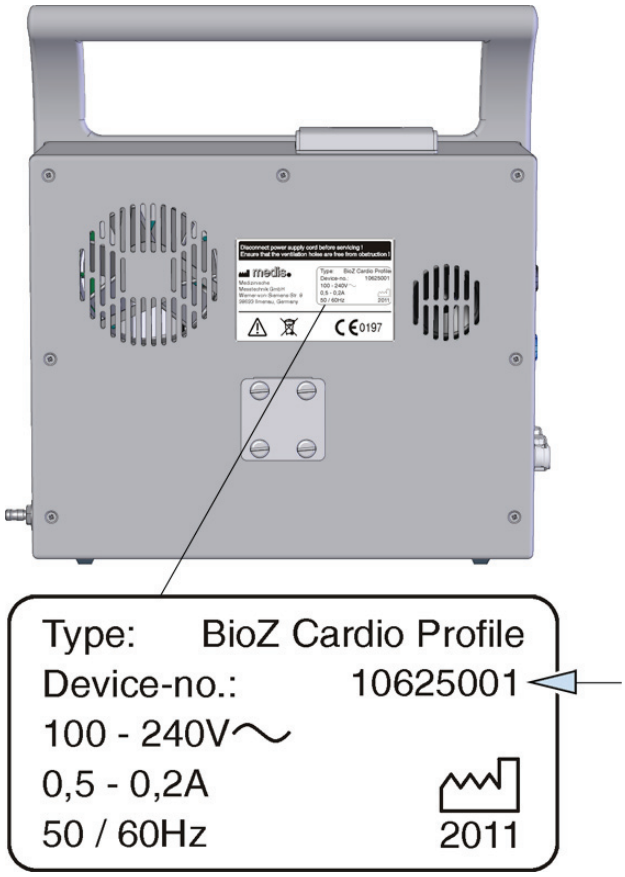
This system may be delivered in different hardware and software configurations. In the event of a service request, it will be necessary to identify your system from our data base.

To identify your system and the installed software version, we need the following information:

- Device number
- System identification printout

4.1 Device Number

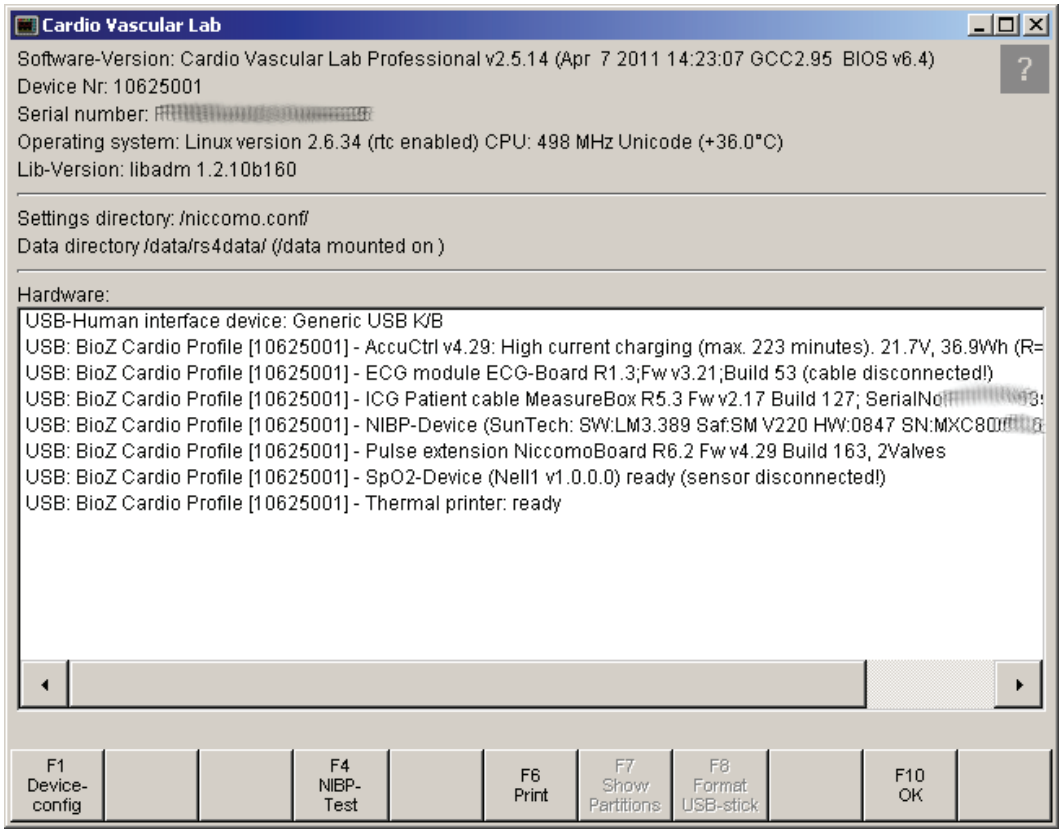
The device number is located on the backside of the system as indicated in the figure to the right.



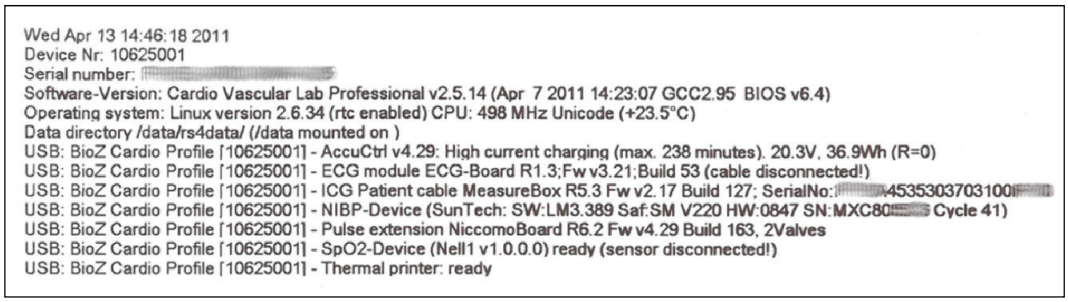
4.2 System Identification Printout

The system identification printout includes all relevant hardware and software information from the system. The following steps will create a system identification printout:

- Power "ON" the system and wait until the patient screen appears
- Press the "Options" button (a new screen appears)
- Press the "Hardware" button (the next screen appears, see figure below)
- Press the "Print" button


Cardio Vascular Lab
Software-Version: Cardio Vascular Lab Professional v2.5.14 (Apr 7 2011 14:23:07 GCC2.95 BIOS v6.4)
Device Nr: 10625001
Serial number:
Operating system: Linux version 2.6.34 (rtc enabled) CPU: 498 MHz Unicode (+36.0°C)
Lib-Version: libadm 1.2.10b160
Settings directory: /niccomo.conf/
Data directory /data/rs4data/ (/data mounted on)
Hardware:
USB-Human interface device: Generic USB K/B
USB: BioZ Cardio Profile [10625001] - AccuCtrl v4.29: High current charging (max. 223 minutes). 21.7V, 36.9Wh (R=
USB: BioZ Cardio Profile [10625001] - ECG module ECG-Board R1.3;Fw v3.21;Build 53 (cable disconnected!)
USB: BioZ Cardio Profile [10625001] - ICG Patient cable MeasureBox R5.3 Fw v2.17 Build 127; SerialNo
USB: BioZ Cardio Profile [10625001] - NIBP-Device (SunTech: SW:LM3.389 Saf:SM V220 HW:0847 SN:MXC80
USB: BioZ Cardio Profile [10625001] - Pulse extension NiccomoBoard R6.2 Fw v4.29 Build 163, 2Valves
USB: BioZ Cardio Profile [10625001] - SpO2-Device (Nell1 v1.0.0.0) ready (sensor disconnected!)
USB: BioZ Cardio Profile [10625001] - Thermal printer: ready
F1 Device-config
F4 NIBP-Test
F6 Print
F7 Show Partitions
F8 Format USB-stick
F10 OK

The integrated strip chart printer will create the below printout.


Wed Apr 13 14:46:18 2011
Device Nr: 10625001
Serial number:
Software-Version: Cardio Vascular Lab Professional v2.5.14 (Apr 7 2011 14:23:07 GCC2.95 BIOS v6.4)
Operating system: Linux version 2.6.34 (rtc enabled) CPU: 498 MHz Unicode (+23.5°C)
Data directory /data/rs4data/ (/data mounted on)
USB: BioZ Cardio Profile [10625001] - AccuCtrl v4.29: High current charging (max. 238 minutes). 20.3V, 36.9Wh (R=0)
USB: BioZ Cardio Profile [10625001] - ECG module ECG-Board R1.3;Fw v3.21;Build 53 (cable disconnected!)
USB: BioZ Cardio Profile [10625001] - ICG Patient cable MeasureBox R5.3 Fw v2.17 Build 127; SerialNo:
USB: BioZ Cardio Profile [10625001] - NIBP-Device (SunTech: SW:LM3.389 Saf:SM V220 HW:0847 SN:MXC80
Cycle 41)
USB: BioZ Cardio Profile [10625001] - Pulse extension NiccomoBoard R6.2 Fw v4.29 Build 163, 2Valves
USB: BioZ Cardio Profile [10625001] - SpO2-Device (Nell1 v1.0.0.0) ready (sensor disconnected!)
USB: BioZ Cardio Profile [10625001] - Thermal printer: ready

Connecting an external printer to the system will create a system identification printout as shown in the figure below.

Date: Wed Apr 13 14:57:32 2011
Device Nr: 10625001
Serial number: [redacted]
Software-Version: Cardio Vascular Lab Professional v2.5.14 (Apr 7 2011 14:23:07 GCC2.95 BIOS v6
Operating system: Linux version 2.6.34 (rtc enabled) CPU: 498 MHz Unicode (+36.0°C)
Printer: /dev/usblp0 (300 dpi)

Settings directory: /niccomo.conf/
Data directory /data/rs4data/ (/data mounted on)

Hardware:

- USB-Printer: Deskjet 6940 series (HP, SerNr: MY81GCS0KJ04Q9)
- USB: BioZ Cardio Profile [10625001] - AccuCtrl v4.29: High current charging (max. 226 minutes). 21.4V, 36.9Wh (R=0)
- USB: BioZ Cardio Profile [10625001] - ECG module ECG-Board R1.3;Fw v3.21;Build 53 (cable disconnected!)
- USB: BioZ Cardio Profile [10625001] - ICG Patient cable MeasureBox R5.3 Fw v2.17 Build 127; SerialNo:[redacted]
- USB: BioZ Cardio Profile [10625001] - NIBP-Device (SunTech: SW:LM3.389 Saf:SM V220 HW:0847 SN:MXC80[redacted]Cycle 41)
- USB: BioZ Cardio Profile [10625001] - Pulse extension NiccomoBoard R6.2 Fw v4.29 Build 163, 2Valves
- USB: BioZ Cardio Profile [10625001] - SpO2-Device (Nell1 v1.0.0.0) ready (sensor disconnected!)
- USB: BioZ Cardio Profile [10625001] - Thermal printer: ready

Please send a copy of this system identification printout to us by e-mail or fax.

5 Default Hardware Configuration

5.1 Hardware Info Screen

Connect all equipment to the Cardio Profile (ICG patient cable, ECG patient cable, NIBP cuff), connect to A.C. power, and go to the Hardware Info Screen (see section 4.2).

Default entries

The following entries should be stated in the Hardware Info Screen:

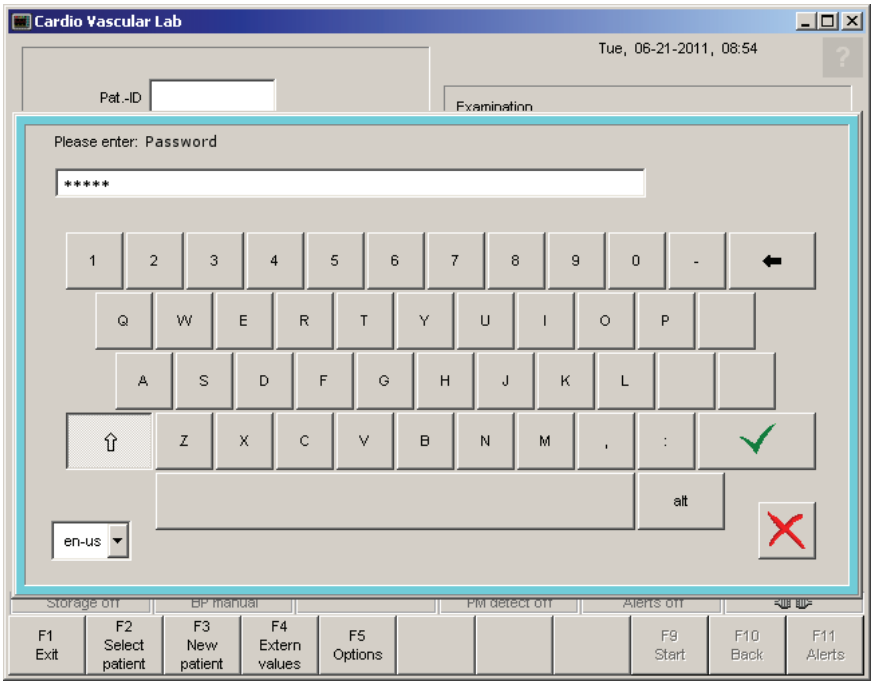
Module	Entries	Note
Battery	AccuCtrl vx.xx: High current charging [+ additional information]	The battery is being charged
	AccuCtrl vx.xx: Accumulator loaded [+ additional information]	The battery is fully charged
	AccuCtrl vx.xx: Accumulator available [+ additional information]	The battery is fully charged
	AccuCtrl vx.xx: Initializing [+ additional information]	The battery is initializing (e.g. after startup), and should change to one of the entries above within some seconds
ECG	ECG module ECG-Board Rx.x,Fw vx.xx; Build xx (cable connected)	The connected ECG board, version and cable is stated
ICG	ICG Patient cable MeasureBox Rx.x Fw vx.xx; Build xxx SerialNo: xxxx	The connected ICG patient cable with Serial Number and Firmware is stated (see section 4.2 for more information)
NIBP	NIBP-Device (SunTech: SW:LMx.xxx Saf:SM Vxxx HW:xxxx SN:xxxx Cycle xxx	The connected NIBP module with Serial Number and Firmware is stated
Pulse	Pulse extension NiccomoBoard Rx.x	Optional. Typically not installed.
Printer	Thermal printer: ready	

There can be additional entries depending on the connected devices (e.g. USB-sticks, printers, etc.).

Using the information in the Hardware Info Screen for troubleshooting is addressed in Section 14 Troubleshooting.

5.2 HIPAA Password

The HIPAA Password configuration is performed by going to “Options” (F5), select “Password” and type in the selected password. Push the keyboard “Enter” (✓) key to save the entry. The system will now require this password during each power “ON” or when the system is at idle for more than 5 minutes. The operator will not be prompted for this password during a patient study.



To remove the password request, go to the password entry screen, leave the password entry line blank, and push the keyboard “Enter” (✓). The system will not prompt for a password request upon power “ON”.

6 Blood Pressure Module Verification

If you have any doubts in the measured blood pressure values or you think the cuff is deflating too quickly, perform the following “Pressure Transducer Verification” or the “Leak Test” to check the function of the NIBP module. If the system fails in one of the performed tests, then the Cardio Profile and the blood pressure supplies must be sent to service for further testing.

6.1 Pressure Transducer Verification

International standards for automated NIBP devices require that the maximum static pressure accuracy shall be ±3 mmHg. This is a stringent requirement and all test equipment must be in excellent working order to properly perform this test. It is important to verify the calibration before changing it. Although experience has shown that the transducers rarely need to be re-calibrated the annually pressure verification is required.

Equipment

- Calibrated Manometer
- Pneumatic "T" Adapters
- Volume (500 mL bottle or regular-sized cuff wrapped around a solid object is suggested)
- Hand Bulb
- Connection Tubing

NOTE: Volume is added to the pneumatic system so that the user has more control of the pressure increments when using the hand bulb. If no volume is added, it is quite easy to cause unwanted overpressure errors using the hand bulb.

Procedure

1. Connect a manometer, volume and the hand bulb to the Module using "T" adapters.
2. Inflate SLOWLY when adding pressure over 200 mmHg.
3. Apply various pressures (between 0 and 280 mmHg) to the Module with the hand bulb. Verify that the Module pressure is equal to the manometer pressure (±3 mmHg).

If the Module pressure does not agree with the manometer pressure, then a calibration is required. Please contact our service support for assistance.

6.2 Leak Test

International standards for automated NIBP devices require that air leakage within the pneumatic system must not exceed 6mmHg/minute. During manufacturing acceptable air leakage is less than 3 mmHg/minute when using a 500 mL rigid volume. Both of these pass criteria will not affect the performance or accuracy of the NIBP module so we suggest using the 6mmHg/minute pass criteria with a 500 mL rigid volume.

Equipment

- Calibrated Manometer (optional may use pressure values supplied by NIBP module)
- Pneumatic "T" Adapters
- Volume (500 mL rigid bottle a blood pressure cuff is not recommended)
- Hand Bulb
- Connection Tubing
- Timer (i.e. Stop Watch)

NOTE 1: Volume is added to the pneumatic system so that the user has more control of the pressure increments when using the hand bulb. If no volume is added, it is quite easy to cause unwanted overpressure errors using the hand bulb. Also, leak rates are exaggerated with extremely small volumes.

NOTE 2: Blood pressure cuffs have large variations in size and materials which can cause large amounts of variation in the leak test results. To limit this effect, we strongly urge to only use a 500 mL rigid volume.

Test Method

1. Connect a manometer, volume and the hand bulb to the Module using "T" adapters.
2. When using a hand bulb, make sure the exhaust valve is closed.
3. Increase the pressure to approximately 250 mmHg using the hand bulb or the pump on the module. It is difficult to slowly increase the pressure in the pneumatic system with the pump so a hand bulb is preferred.

   NOTE: When applying high pressures, take special care to increase the pressure at a rate that will not cause unwanted overpressure errors (300 mmHg).

4. Start the timer and wait 60 seconds for the pneumatic system to reach its pressure equilibrium point. All pneumatic systems have some degree of expansion and rebound which are affected by the several factors including volume, material types and material durometers.
5. After the waiting period, record the pneumatic pressure level (P1) and wait another 60 seconds and record the pneumatic pressure level again (P2).

   NOTE: Safety circuitry on the module only allows the pressure in the pneumatic system to remain above 10 mmHg for 180 seconds. When this safety time limit is exceeded, the valves will open and the module will be disabled. To reset the NIBP module, it must have the power cycled or it needs to be set to its sleep mode and awakened. Not all NIBP module customers have the ability to use the sleep mode.

6. Open the hand bulb valve to exhaust the air from the pneumatic system.
7. Subtract P2 from P1 and this is the leak rate per minute.

7 Touchscreen Calibration

Recalibration of the touch screen may be necessary when:

1. Pressing a touchscreen button does not activate that function, but the 'click' sound is heard.
2. Pressing a touchscreen button activates a nearby function.

To calibrate the touchscreen, please perform the following steps:

1. Power “OFF” then power “ON” the system. (The calibration function can only be performed on a freshly restarted system.)

2. When the patient data screen is displayed, touch the screen on any random blank area and continue pressing the screen (for approximately 5 seconds) until the calibration menu is displayed (see next picture).

3. The calibration menu will prompt you to touch every corner of the screen display. The touched positions will be saved as the calibrated data and now the touchscreen operation will respond properly to the keystrokes entries.

8 External Fuse Replacement

The system is protected by 2 fuses which may be removed as shown in the figure to the right.

Open the fuse compartment using a screw driver. Use care to not damage the case.

WARNING

Make sure the replacement fuse is of the same type and value. Use of a substitute fuse type or value may result in safety risks or damage to the system. (1.0 Amp Slo-Blo. See the Parts List for more information)

If the replacement fuses continue to fail, then the system requires inspection by an authorized service department.

9 Battery Pack Replacement

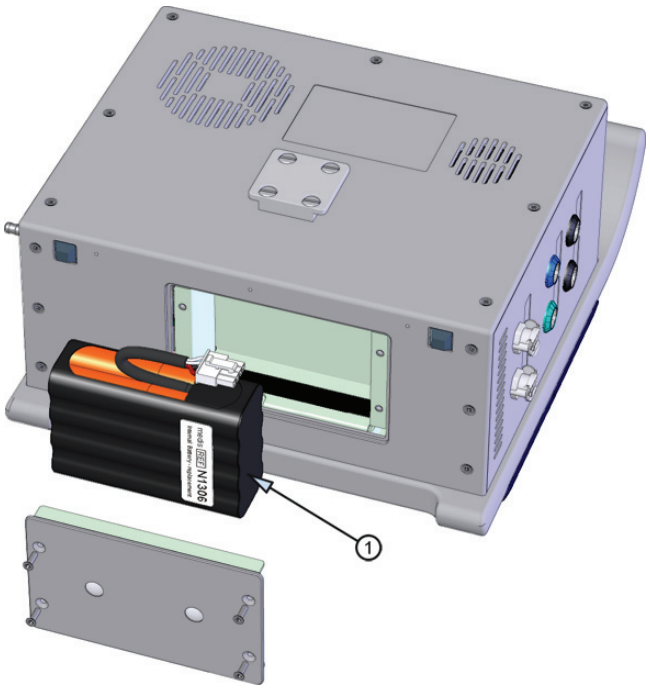
The battery pack can be disconnected or replaced by opening the battery compartment cover located on the bottom of the system. This compartment cover entry allows access to the battery without having to remove the system enclosure.

This procedure requires the removal of 4 Philips screws securing the battery access cover.

Access into the battery compartment will allow the battery cable to be disconnected or the removal/replacement of the battery pack (1).

Battery pack replacement requires performing the above steps in the reverse order.

Upon battery pack reinstallation, ensure that the battery cable is connected and routed properly as to not be pinched or cut by the internal hardware or the battery compartment cover. Secure this cover with the 4 screws removed earlier.



10 Opening the System

WARNING

Turn "OFF" the power switch and disconnect the A.C. power cord from the system.

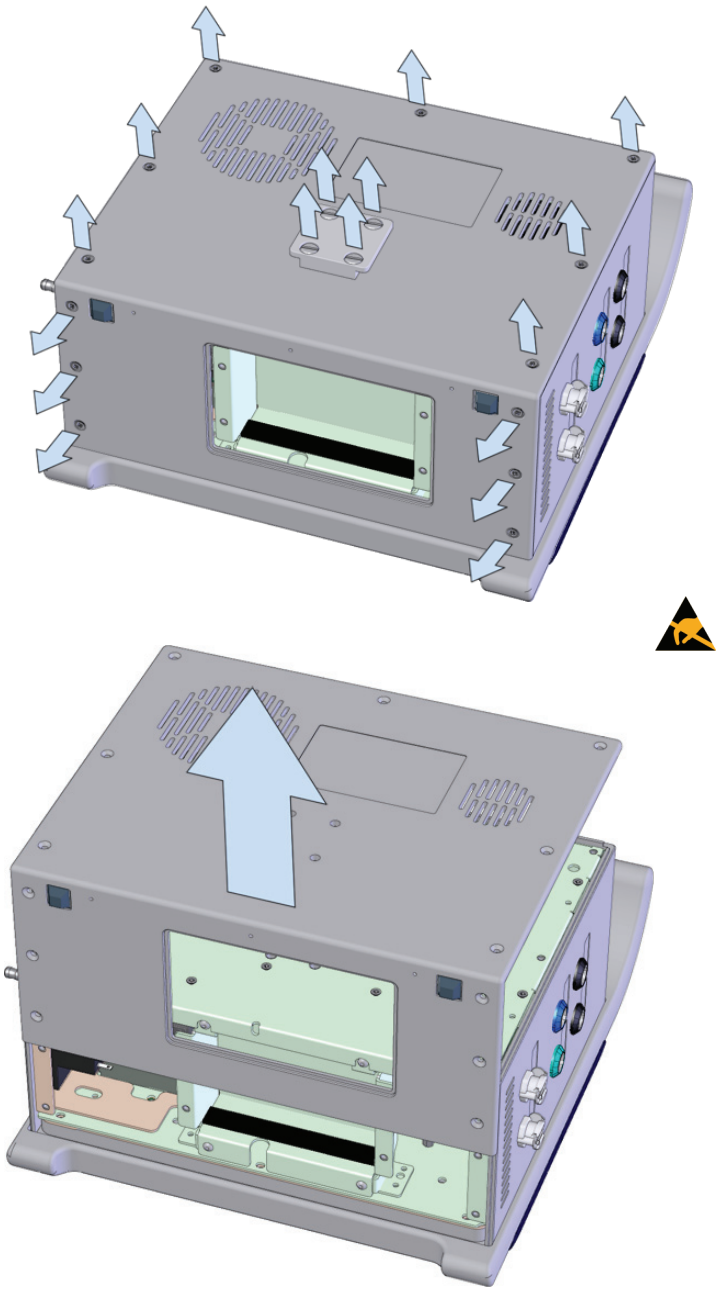
Place the system on its front side as shown in the figure to the right and use a soft underlay so that the display/touch screen will not be damaged.

Before you open the system enclosure, it is important that you have disconnected and removed the battery pack as previously described. Failure to do so will result in the battery pack falling down and/or creating an electrical short.

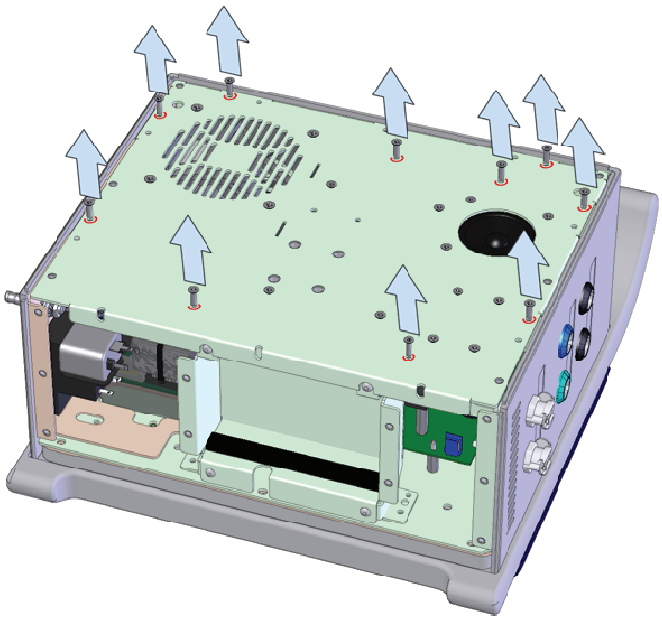
Remove the 4 middle screws of the system back panel.

Now remove the remaining 13 back panel screws.

The enclosure is now loose and will allow movement upward to clear the system. (See the figure to the right).



Remove only the 10 red marked screws from the backside of the inner metallic shield using a Philips screwdriver. (Refer to the figure to the right).

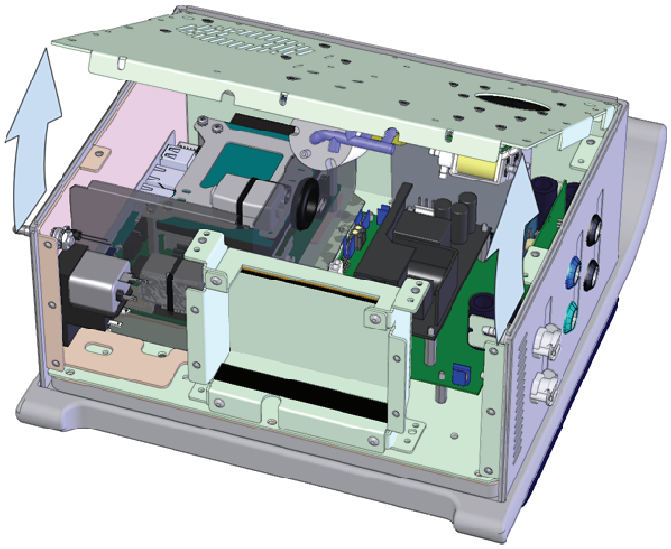


Caution

Do not apply excessive downward force while removing the screws. Too much force will cause the press-fit nut to separate and drop from its mount on the metallic shield.

Attention

Removal of the other screws that are not marked red will result in loosening other components such as the fan, loudspeaker, and blood pressure module.



Moving the metallic inner panel upward will allow enough space to disconnect electrical cables and the blood pressure module tubing.

Caution

Use caution when moving the internal metallic panel as damage could result to the internal parts and the electrical cables.

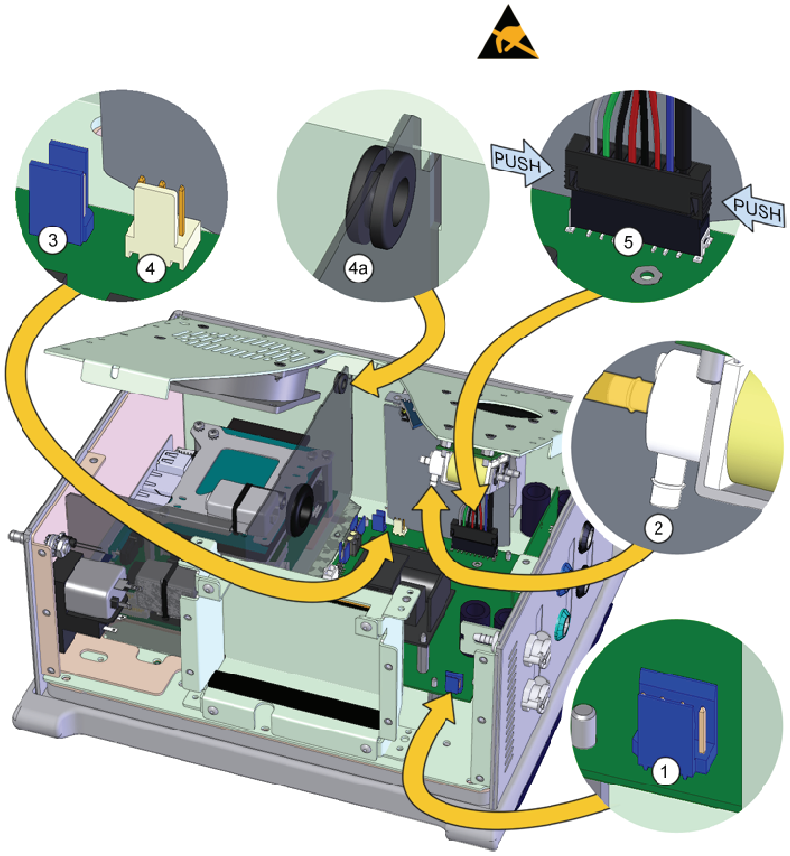
After the case has been opened, electronic cables and the blood pressure module tubing may be disconnected.

The cables and tubing have the following attachments:

(1) Valve control cable
(2) BP module tubing
(3) Loudspeaker
(4) Fan
(5) BP module cable

Disconnecting the BP module cable requires both sides of the connector to be pressed simultaneously to release.

Now the backside can be completely removed.

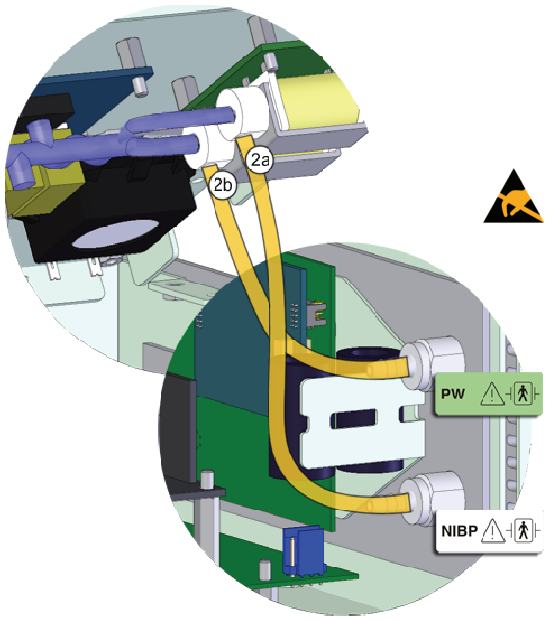


System reassembly will require additional attention during the following steps:

The BP module tubing must be reinstalled on the correct valves:

(2a) NIBP module tubing
(2b) PW module tubing

Figure (4a) shows in detail the proper fan cable routing to avoid damage to this cable from the metallic shield. Damage to this cable may result in a short-circuit fault.



11 Replacing the Hard Disk Drive

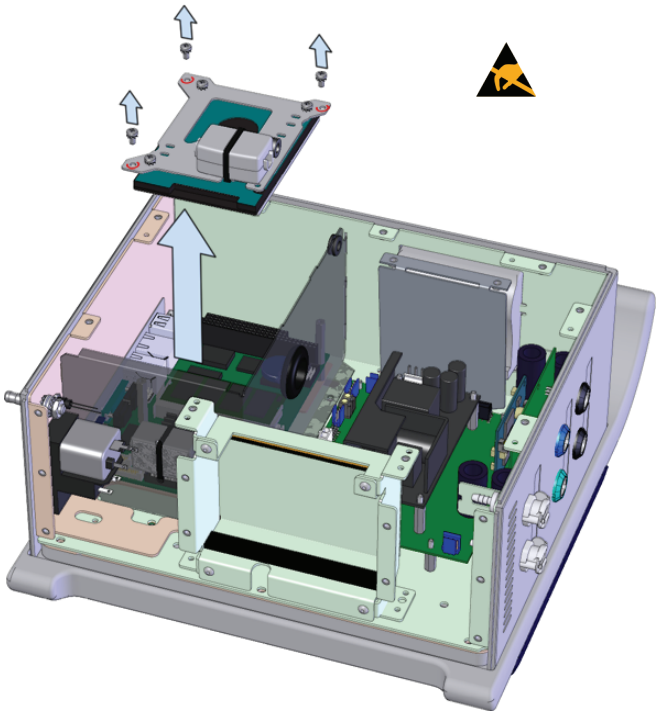
Disconnect the hard disk drive cable.

Remove the 3 Philips screws shown in the figure to the right.

Remove the hard disk drive as show in the figure to the right.

Installing the replacement hard disk drive requires performing the above steps in the reverse order.

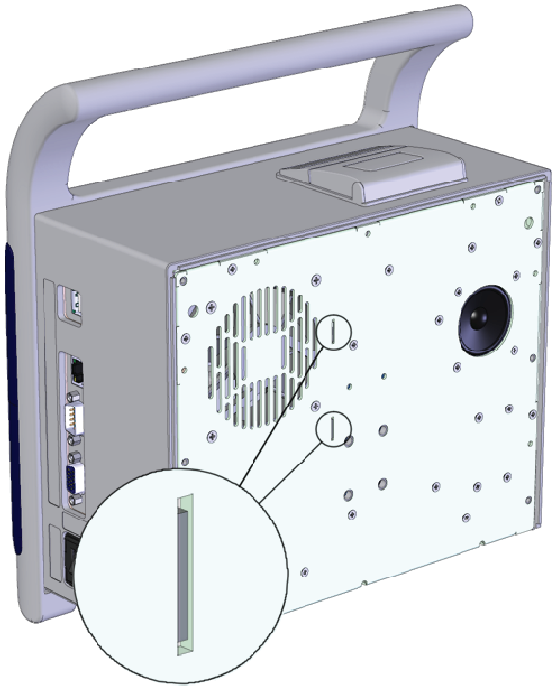
Make sure that the hard disk drive cable is correctly connected and that the screws are securely tightened.



12 Assembling the System

System reassembly requires the steps from Section 10 (Opening the System) be performed in the reverse order.

When reinstalling the metallic back panel to the enclosure, ensure that the connecting slots of the internal shield align into the corresponding tabs as shown in the figure to the right.



Caution

Carefully check that the fan cable is not damaged from being cut by the internal shielding and the metallic back panel. Damage to this cable may result in a short-circuit and/or subsequent damage to the electronic components.

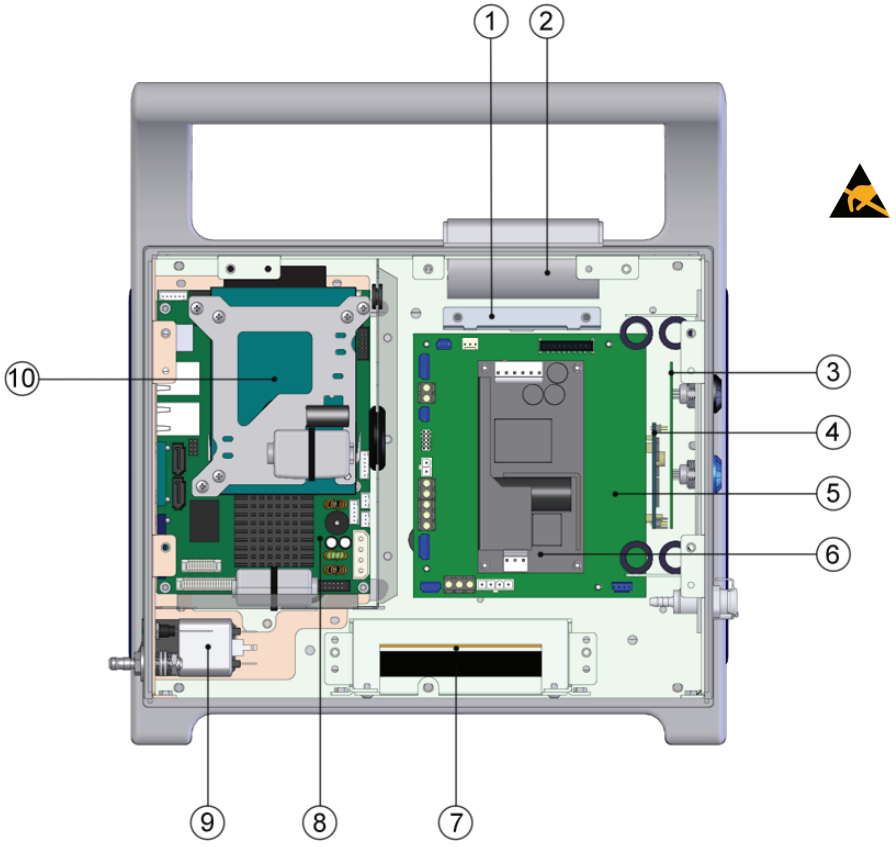
WARNING

All necessary function and safety tests must be performed and filed after the reassembly of this system.

13 System Overview

13.1 Basic Components

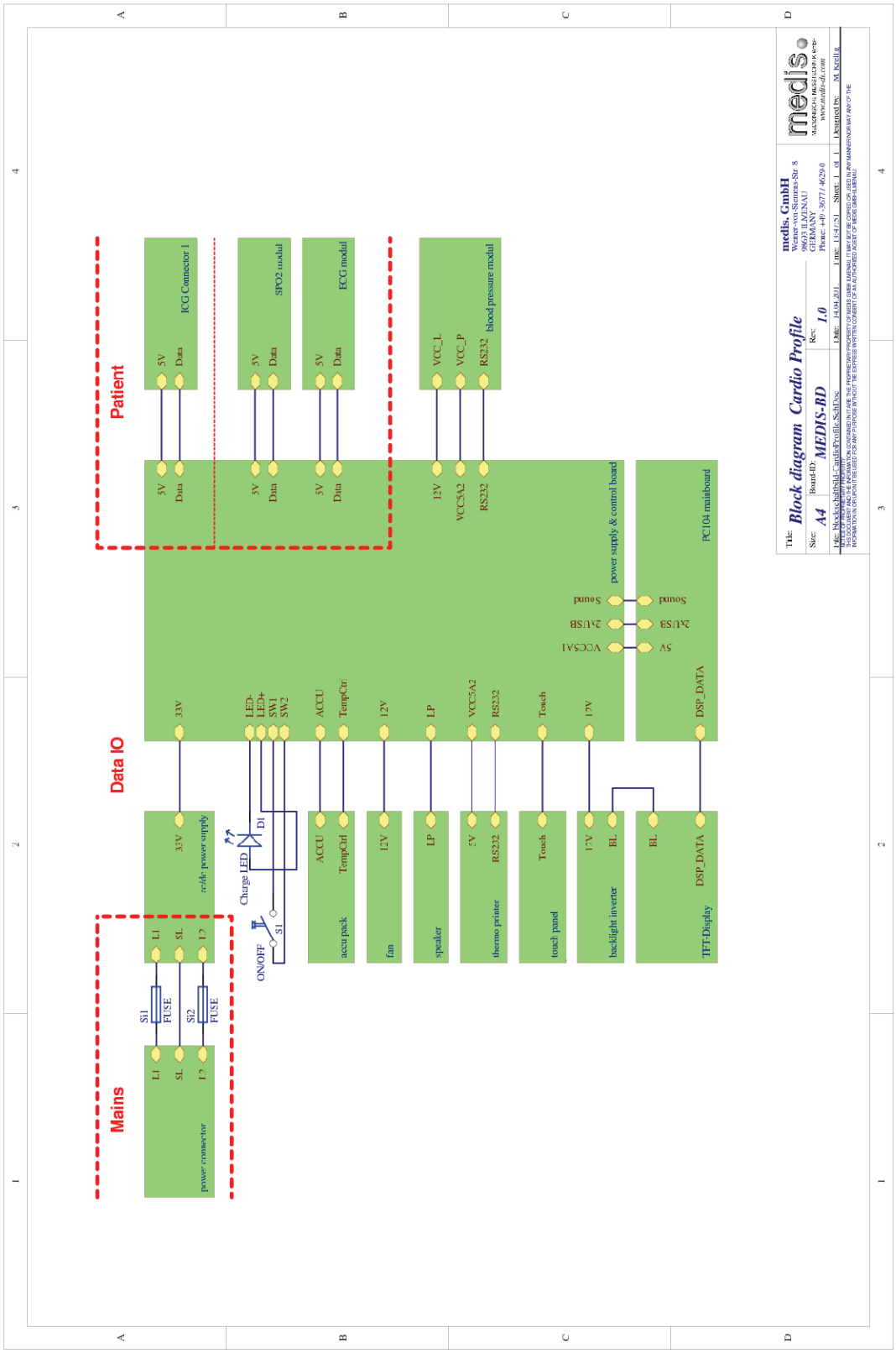
The figure below shows the internal view of the system and identifies the following internal components:



(1) Power supply module protector
(2) Strip chart printer
(3) Multi-channel measurement Input module
(4) SpO2 measurement module (optional)
(5) Power management board
(6) Power supply module
(7) Battery pack
(8) Computer board
(9) Power connection module
(10) Hard disk drive

13.2 Block Diagram

14



Troubleshooting

The BioZ Cardio Profile is designed for reliable operation. If you experience any problems with the system, there are several things that you should verify prior to calling for service.

14.1 System Errors

Problem(s)	Possible Causes	Potential Solutions
System fails to start when connected to the A.C. power mains	• System not connected to live A.C. mains • Defective (blown) fuses	• Connect A.C. power cord • Check if wall socket is live • Replace defective fuses (see section 8)
System does not start when running on battery	• Battery is drained or defective	• Connect A.C. power cord to recharge battery • Check Hardware Info Screen (see section 4.2 and 5.1) for battery status
System starts but display remains black	• Hardware failure	• Connect A.C. power supply cord and restart the system
Unusually long startup (boot up) time	• System is performing a hard disk drive check	Wait, until the check is performed. Do not power "OFF" the system. The system will perform this check after every 20th restart.
Touch screen does not work as intended (e.g. select wrong function)	• Touch screen has calibration issue	Perform the touch screen calibration (see section 7)
Battery is not recharging	• System not connected to A.C. power mains • Battery is defective	• Connect A.C. power cord to recharge battery • Check if the A.C. wall supply is live • Check Hardware Info Screen (see section 4.2 and 5.1) for battery status • Replace battery (see section 9)
Printer does not work	• Printer paper is empty • Printer cover is not closed	• Replace the paper • Close the printer cover • Check the Hardware Info Screen (see section 4.2 and 5.1)
Printer makes an unexpected clicking or grinding noise	• Printer mechanical failure	• Open the printer's cover and check for any obstructions
No measurement data is stored to the hard disk drive	• Data storage is deactivated • Measurement was too short or did not include enough valid data • Hard disk drive is full	Check if: • The data storage option is activated in the Option screen • Valid data was recorded • The hard drive capacity is at 0%

14.2 ICG/ECG Errors

Problem(s)	Possible Causes	Potential Solutions
An ICG measurement cannot be started. (ICG button is not available to select as exam type).	• ICG patient cable is not connected	• Connect the ICG patient cable () to the system • Check the Hardware Info Screen (see section 4.2 and 5.1)
ECG or ICG has excessive artifact	• Patient movement • Sensors are dry • Sensors are not properly applied	• Check the ICG patient cable () LEDs for details (see section 14.5) • Prep the patient's skin with soap and water before applying sensors • Be sure patient is laying still (motion such as coughing and talking will produce instability in the waveform) • Remove any jewelry that may interfere with the lead wires • Attach fresh sensors • Reposition the sensors
No heart rate is measured during ICG measurement	• ECG cable is connected to the system, but not to the patient	• Remove the ECG cable from the system and restart the measurement **or** • Connect ECG patient cable to the patient • Invert the ECG waveform
	• ECG vector cannot be measured with the ICG patient cable	• Connect the ECG patient cable to the system and at the patient, and restart the measurement

14.3 Blood Pressure Errors

Problem(s)	Possible Causes	Potential Solutions
Weak or No Oscillometric Signal Artifact / Erratic Oscillometric Signal Exceeded Measurement Time Limit	• Cuff is in wrong position • Cuff is loose on patient's arm • Excessive clothing between cuff and patient's arm • Cuff is the wrong size • Patient is not motionless and relaxing their arm • Patient has weak and/or low pulse	Reapply Cuff and retake BP ensuring that: • The arrow on the cuff is located over the patient's artery just above the elbow joint • The cuff is wrapped snugly • There isn't excess clothing under the cuff • The size is correct for the patient's arm circumference • The patient is motionless with their arm relaxed during the measurement cycle
Pneumatic Blockage	• Hose, cuff, and/or fittings are blocked • Hose or cuff is crimped and/or folded	• Clear hose, cuff or fittings of any blockage • Replace hose and/or cuff
Cuff Overpressure	• Hose, cuff, and/or fittings are blocked • Hose or cuff is crimped and/or folded	• Clear hose, cuff or fittings of any blockage • Replace hose and/or cuff
Inflate Timeout, Air leak or Loose Cuff	• Hose, cuff, and/or fittings have a leak • Cuff is loose • Hose, cuff or fittings are not connected properly	• Check cuff connection • Replace hose, cuff and/or fittings
Blood pressure measurement does not start	• Input error • Communication error • Hardware error	• Check, if the measurement was started properly • Check the Hardware Info Screen for the NIBP module status (see section 4.2 and 5.1)

14.4 Hardware Info Screen - Failure Entries

The following entries can be an indicator of a hardware failure. Follow the information in the "Note" section. If any "Entries" remain for the corresponding module, then the system with its equipment must be sent to service for further testing.

Module	Entries	Note
Battery	AccuCtrl vx.xx: Running on accumulator-power [+ additional information]	System is running on battery even though it is connect to the wall supply. Check if: • A.C. power cord is properly connected • A.C. source is live • Blown fuses • Defective A.C. power cord
	AccuCtrl vx.xx: waiting [+ additional information]	The battery control board was not found
	AccuCtrl vx.xx: No accumulator found [+ additional information]	No battery is connected to the system Check if: • Battery is properly connected to the system (see section 9 for details)
	AccuCtrl vx.xx: Accumulator possibly defective! [+ additional information]	The battery is defective and should be replaced. See section 9 for details.
ICG	Patient cable: Waiting…	Searching for ICG patient cable even though it is connected. Check if: • ICG cable is properly connected to the system See section 14.5 for more information.
ECG	ECG module ECG-Board Rx.x,Fw vx.xx; Build xx (cable disconnected!)	Searching for ECG patient cable even though it is connected Check if: • ECG cable is properly connected to the system

14.5 ICG Patient Cable Troubleshooting

During the ICG mode of operation, the green LED on the ICG patient cable () will be constantly illuminated while the red LED will remain unlighted.

The Cardio Profile ICG waveform should be free of noise and artifacts.

In case of a problem, check the LEDs on the patient cable using the chart below:

Green	Orange	Description of function
○	○	The electronic part of the patient cable is not connected with the power supply; cable is disconnected or the system is switched off
☼	○	Patient cable is ready to use, but the measurement has not been started
●	○	Measurement is running; sensor contact is good
●	☼	Bad contact between sensors and patient: at least one lead wire is disconnected or not properly fixed; sensors are too dry (eventually new sensors are necessary)
●	●	Insufficient contact between sensors and patient: at least one lead wire is disconnected or not properly fixed; sensors are too dry (new sensors are necessary)
○	☼	Patient cable has power but the software cannot access the cable; software has not been started or is not ready for measurement

Legend: ○ LED off ☼ LED flashing ● LED on

15 Parts List

Service Exchange Unit, BioZ Cardio Profile	P15399-01
Service Exchange Unit, ICG/ECG Cable	P15400-01
Service Kit, Replacement Fasteners, BioZ Cardio Profile Stand	P15477-01
Service Kit, Replacement Casters, BioZ Cardio Profile Stand	P15478-01
Battery Pack, BioZ Cardio Profile	P15086-01
Cable, Patient, ICG/ECG	P15002-01
Cable, Patient, ECG	P15003-01
Cuff, Adult, NIBP, (23-33 cm)	P15006-01
Cuff, Adult, NIBP, Large, (31-40 cm)	P15480-01
Cuff, Adult, NIBP, Small, (17-25 cm)	P15481-01
Cord set, 10 Amp, C13 Connector, Hosp. Grade, N. Amer.	P00848-01
Hose, Air, NIBP	P15007-01
Kit, Basket, BioZ Cardio Profile Basic Stand	P15065-01
Monitor Fixation Clamp	P15482-01
Paper, Thermal Printer (10 pack)	P15009-01
Stand, Basic, BioZ Profile Systems	P15062-01
System Mount, Basic Stand, BioZ Cardio Profile	P15064-01
Fuse, 1.0 A, Slo-Blo, 250 VAC, 5 X 20 MM	P15787-01

P15738-01